

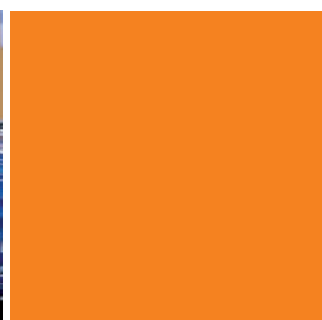
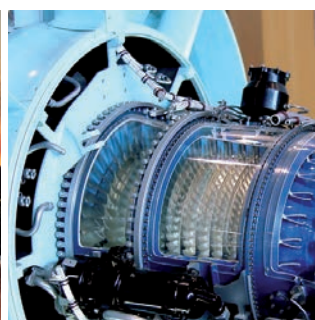


### Measurement parameter

- Calorific value / heating value
- Wobbe index
- Specific density
- CARI, air requirement

### Applications

- LNG-Terminals
- Offshore Process gas regulation
- Fuel regulation for gas turbines



# CWD2005 DPC



Calorimeter with type approval for operation in hazardous area

The combustion calorimeters of the **CWD2005 (Calorimetry, Wobbe Index, Specific Density)** device series are used to determine the gas quality and the associated measured quantities:

- Calorific value / heating value
- Wobbe index
- Specific density
- CARI, air requirement.

The **CWD2005 DPC (Direct Purge Certified)** is a variant of the CWD2005 for use in hazardous area. The NRTL (Nationally Recognized Testing Laboratories) certification is carried out by SGS North America and confirms conformity with the following standards:

- UL 61010-1, 3rd edition, May 11, 2012 (Electrical safety)
- NFPA 496, 2013 and
- ANSI/ISA 1212.01 (Operation in hazardous areas, Class I, Division 2, Groups B, C, D, T4).

The system is intended for installation in an enclosed space with external energy and compressed air supplies.

It is typically used for flare gas combustion, control of gas turbines and fuel control in refineries and petrochemical plants.

### Typical measuring ranges of CWD2005 DPC

| Gas type          | Measuring range [MJ/m <sup>3</sup> ] | Upstream pressure [mbar] | Wobbe index accuracy [± % MBE] | Typical gas consumption [l/h] |
|-------------------|--------------------------------------|--------------------------|--------------------------------|-------------------------------|
| Flare gas         | 0 – 15                               | 40                       | 3.0                            | 40                            |
| Blast furnace gas | 3.5 – 6                              | 40                       | 3.0                            | 170                           |
| Converter gas     | 4.5 – 9                              | 40                       | 1.5                            | 140                           |
| Mixed gas         | 5 – 10                               | 40                       | 2.0                            | 140                           |
| Coke oven gas     | 15 – 30                              | 40                       | 1.5                            | 60                            |
| Biogas            | 25 – 35                              | 40                       | 1.5                            | 70                            |
| Natural gas       | 25 – 48                              | 20                       | 1.0                            | 25                            |
| Refinery gas      | 25 – 50                              | 40                       | 1.5                            | 25                            |
| LPG               | 40 – 90                              | 20                       | 1.5                            | 15                            |

Table 1: Typical measuring ranges



Figure 1: CWD2005 DPC

**Direct and continuous determination** of gas quality by combustion calorimeter has been a proven, high-accuracy measurement principle for more than 60 years (see Table 1). During combustion of a defined gas volume, all gas components are thermally converted. The energy released in the process is proportional to the Wobbe Index. The specific density of the gas is measured simultaneously so that the heating value can be calculated from these two values.

Because it also measures unexpected and unknown gas components, the CWD2005 DPC can be used with a rapidly changing gas composition, such as in the case of residual gases of chemical processes or synthetic gases in the steel industry.

In addition, the system provides a high level of safety in the event of a process shutdown or interruption of the gas supply by extinguishing its flame after a maximum of 10 seconds.

## System design

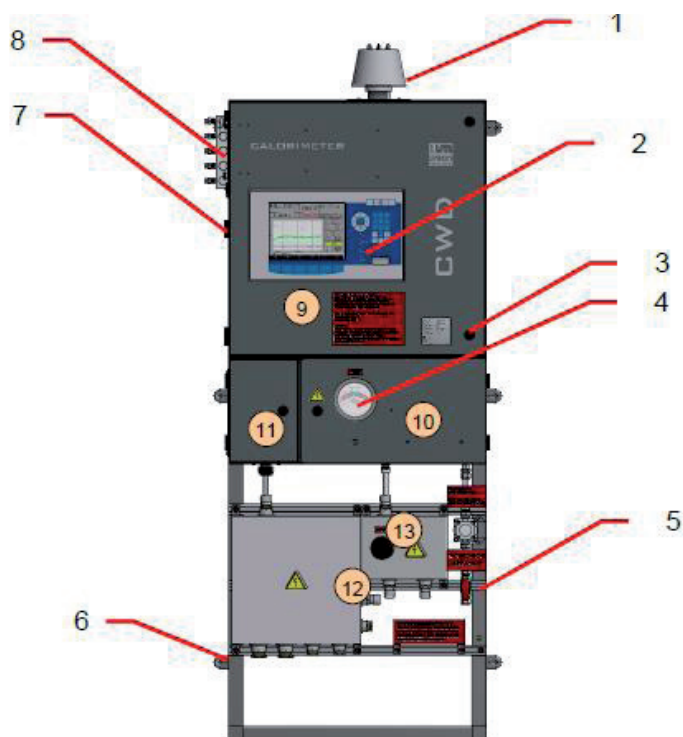


Figure 2: CWD2005 DPC system design

- 1 Outlet for off-gas and compressed air
- 2 Operator control unit and display
- 3 Door interlock (2 per door)
- 4 Pressure indicator
- 5 Inlet for purge gas (instrument air)
- 6 Mounting frame
- 7 USB connection (for service purposes)
- 8 Inlet for process gas and calibration gas
- 9 CWD2005 PLUS combustion calorimeter
- 10 Internal voltage supply
- 11 Internal signal output
- 12 Connection box; signal output
- 13 Main switch

The central component is the CWD2005 PLUS combustion calorimeter that is mounted in a pressurized protective enclosure purged with compressed air.

Additional components of the CWD2005 SPC are:

- Connection boxes (approval: IECEx, ATEX)
- Ventilation system for the protective enclosure
- Manometer and pressure switch on the protective enclosure
- Compressed air supply and ball valve.

The operator control unit comprises the central controller, display and keyboard and is connected to two electronic modules via an internal device bus. The measurement module collects the measurement data and the I/O module undertakes the external communication.

The software is based on a real-time operating system. It is structured in various menu levels that are reached using softkeys.

The device is equipped with a separate calibration gas supply (optionally 2) for calibration. Time-controlled calibration is possible.

## Technical data

### Technical data for CWD2005 DPC

|                               |   |
|-------------------------------|---|
| Weight                        | Up to 85 kg   |
| Dimensions                    | 822 x 1798 x 399  |
| W x H x D [mm]                | + 300 (H) for flame arrester  |
| Degree of protection          | IP 50   |
| Ex classification             | Class I, Div. 2, Group B, C, D, T4  |
| Ambient temperature           | 5 – 40 °C   |
| Ambient humidity              | 0 – 95% relative  |
| External pressure             | 800 – 1100 hPa (0.8 – 1.1 bar)  |
| Supply pressure of gas        | 30 – 40 mbar  |
| Process gas supply            | 1   |
| Calibration gas supply        | 2   |
| Carrier gas supply            | 1   |
| Relative gas humidity         | ≤ 95%, condensate-free  |
| Supply temperature of gas     | max. 45 °C  |
| Instrument air consumption    | 25 m <sup>3</sup> /h (standard conditions)  |
| Instrument air pressure       | min. 5 bar, max. 10 bar   |
| Voltage                       | 240 VAC, 50/60 Hz<br>110 VAC, 60 Hz   |
| Interfaces                    | 3 x relay; RS232; 4 – 20 mA;<br>fieldbus; Profibus DP; Profinet IO;<br>Modbus RTU/TCP;<br>Industrial Ethernet |
| T90 display time              | 15 s  |
| Certifications/<br>Conformity | UL 61010-1, 3rd edition;<br>NFPA 496, 2013; ANSI/ISA 1212.01  |
| Approval                      | IECEx PTB 09.0048   |
| Connection box                | PTB ATEX 1108   |

Table 2: Technical data for CWD2005 DPC



## About UNION Instruments

UNION Instruments GmbH, founded in 1919, is a specialized supplier of measuring instruments in the areas of calorimetry and gas composition. Its user and customer base includes biogas producers, the chemical industry, and energy and water suppliers. The company has its headquarters in Karlsruhe and a subsidiary in Lübeck. With 30 international distributors, UNION Instruments operates worldwide. The company's core businesses include development and production as well as maintenance, service, and support.

## Our service performance



### Support

The **UNION-hotline** helps to solve all inquiries and urgent issues fast and easy. Device specific concerns can be solved worldwide within minutes by direct communication via TEAMVIEWER.



### Original spare parts

Original spare parts for the majority of UNION's products are on stock directly at site and ready for dispatch within a few hours.



### Software

For read-out of measurement and calibration data a device-specific software is available for our clients. In addition to the graphic display of measurement data its export in several database formats is possible.



### Training

UNION offers individual in-house training or on-site seminars for installation, use and maintenance of our devices even at the customer's premises. Training is individually adapted to the client's requirements.



### Repair service

A global service for inspection, maintenance and repair of our devices and systems is provided directly by UNION and via its distributors.



### Certification

Since 20 years we have implemented the ISO9001 system. UNION's products are certified to ATEX and UL/CSA directives accordingly. Industrial safety "**Safety with System**" is part of UNION's company policy.



### Engineering

In the last decades UNION compiled a very high level to the state of the art that covers many market segments. So a wide range of possible solution approaches is on-hand.



### Calibration

As part of maintenance and service UNION provides the validation and re-calibration of measuring devices in conformity with certified custody transfer instruments and / or traceable perpendicular.

[www.union-instruments.com](http://www.union-instruments.com)

UNION Instruments GmbH ■ Zeppelinstraße 42, 76185 Karlsruhe, Germany  
Phone: +49 (0) 721-68 03 81 0 ■ Fax: +49 (0) 721-68 03 81 33  
E-Mail: [info@union-instruments.com](mailto:info@union-instruments.com)